

Zero Retries issue 0020 2021-11-26

Advanced Amateur Radio - Data Communications; Space; Microwave... the fun stuff! Nothing great has ever been accomplished without irrational exuberance - Tom Evslin. Irrational exuberance is pretty much the business model of Zero Retries Newsletter - Steve Stroh N8GNJ. The Universal Purpose of Ham Radio is to have fun messing around with radios - Bob Witte K0NR. We are confronted by insurmountable opportunities! - Pogo. Ultimately, amateur radio must prove that it is useful for society - Dr. Karl Meinzer DJ4ZC.

Steve Stroh N8GNJ, Editor

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Request to Send

I'm writing this issue of Zero Retries during the previous week than you're reading it so that I can largely "set it and forget it" during the US Thanksgiving (Thursday, 2021-11-25) holiday week. Tina KD7WSF and I will be entertaining family and friends, thus lots of preparation will be required.

I have much to be thankful for in my life, not the least of which are you readers, without which there wouldn't be much point in having this much fun creating Zero Retries each week. There are now 175+ of you Thanks for that!

Happy Thanksgiving, US Zero Retries readers!

Supporting TAPR

I've rejoined [TAPR](#). The sole unique benefit I received from my \$30 membership was a \$1.20 discount on an item that I ordered at the same time as I paid for my membership. You'd think that maintaining my membership in TAPR would be a no-brainer for a former TAPR Board Member. Truth be told, I lost faith in TAPR more than a decade ago as it dabbled in projects that I considered too far afield of what Amateur Radio really needed. From my perspective, for a while, TAPR was entirely dominated by creating and selling components of the High Performance Software Defined Radio, and I thought that TAPR might as well just convert the organization entirely to sell those products.

Despite that dissatisfaction, one great project that TAPR has maintained for decades now is to host the annual [Digital Communications Conference \(DCC\)](#). The DCC has paid huge, but subtle dividends into Amateur Radio over the decades by providing a cross-fertilization for some of the brightest people with amazing ideas.

Another product of TAPR that I value is the quarterly [Packet Status Register newsletter](#). Unlike ARRL, CQ, AMSAT-NA, and other organizations, PSR is open access - anyone can read it and be inspired and informed without payment. It's even more impressive that all PSR issues back to [Issue 001 \(July, 1982\)](#) remain proudly online from TAPR. No stealth scanning and posting on obscure websites required.

For those two reasons alone I should have remained a (paid) member to help keep it going. But, I didn't, and TAPR's various fumbles with its membership systems not reminding me that my membership had lapsed, no "membership drives", and not attending Hamvention and seeing the TAPR booth there as often as I once did, I just... *didn't*... renew my TAPR membership.

What caused me to renew my TAPR membership now in November, 2021 was writing my article on Technological Tribalism in Zero Retries 0019. It occurred to me that TAPR is the only Amateur Radio organization in the US that is:

- National in scope,
- Has deep technological depth,
- Has a history of leadership on technological issues in Amateur Radio,
- When required to create a new device, system, or technology (like it did with the [TNC-1 and TNC-2](#)), TAPR can step uniquely step into the role of

offering hardware products that no one else is willing to do, especially those that require expensive R&D that isn't feasible in a for-profit company. It's doing so now with the [Tangerine SDR project](#).

- Isn't otherwise constrained; TAPR's organization structure *allows it the latitude* to provide such leadership in Amateur Radio

For those reasons, I think that TAPR is the best shot we have at regaining some unified technological progress on Amateur Radio data communications in the US. (There are, of course, other national Amateur Radio organizations, but the focus of those organizations is largely operational, not technological, and they have various constraints.)

Thus, I've renewed my personal financial support for TAPR on an ongoing basis, and I encourage Zero Retries readers to also do so. If you do decide to support TAPR after reading this, please mention that Zero Retries sent you.

How Stuff Works - Radio

The [How Stuff Works website](#) was the genesis of the now incredibly popular [Stuff You Should Know podcast](#) (I'm a listener). As regular readers know, I'm a fan of reading text, but (audio) podcasts have their place when I'm working on a project that doesn't require intense focus. I was looking something up something else, and I found these "Zero Retries Interesting" How Stuff Works articles:

- [How Radio Works](#)
- [How the Radio Spectrum Works](#)
- [How Ham Radio Works](#)
- [How Radio Scanners Work](#)

The Stuff You Should Know podcast episode "[Ham Radio and the Hams Who Use Them](#)" is definitely worth a listen. Description:

If you thought that Ham Radio enthusiasts were (mostly) men and boys who sit alone late at night in order to scan frequencies searching for a human connection then you're absolutely correct. But it's much more than that.

Bridgecom Systems Exits the 222-225 MHz Repeater Business

Then again, *maybe not*.

(In preparation for this article, I reached out to Bridgecom Systems with a request to chat, but didn't receive a response.)

On 2021-11-12 on the [Facebook 220 MHz Radio Group](#), Josh Landewee (Inside Sales at Bridgecom Systems) posted:

Hey guys - Josh with BridgeCom Systems, Inc. We are getting ready to discontinue the 220 repeaters. We have the ability to make 1 more. If you are looking for one or would like to grab the last one for a replacement let me know.

I followed up with Josh, and I'm now the defacto owner of that very last Bridgecom Systems BCR-220 repeater. (Defacto, as it has not yet been manufactured... but it's in the manufacturing pipeline. When it is manufactured, it's got my name on it.)

In Josh's Facebook thread, there's the usual idiocy of a public Facebook group, including the obligatory phrase uttered only by the most clueless of Amateur Radio Operators: "*Real Ham Radio*". (In my opinion, whenever you hear someone utter that phrase, you can just tune out that person from then on. But I digress.)

Josh probably said more than he should have, but some of the exchange was revealing, and since this was a public group, I feel it's fair to quote his relevant statements:

There is a way we can continue 220 but it will take help of the people using them as well.
It doesn't really have anything to do with not being a top seller as much as it is very hard to get the 220 modules.
The logic is this in order to continue providing this niche band we have to buy about \$50,000 worth of inventory at a time and it takes close to eight months to get it. That's a lot of money to be floating around with nothing to sell for a business.

Then Ron Kochanowicz KC0QVT (Bridgecom Systems Founder / Owner) joined the discussion:

Hi Group. We can get 220 modules. However, lead time for production is now 8 months. Plus, we've been told costs have gone up on many of the parts. The factory has minimum order quantities and requires 30% up front to get the ball rolling. This is common practice when using contract manufacturers as it takes time and money to set up a production line. In addition, they need to make effort to procure all the parts. I realize everyone here loves 220 MHz. If the market wanted it, we could test demand and do some sort of kickstarter campaign to see how much demand there is for our BCM-220 and BCR-220 offerings. I welcome any constructive input. 73! Hope everyone is having an awesome day!

Because Bridgecom had discontinued the BCR-220, I couldn't use the normal website purchase process. When I finally made direct contact with Josh to confirm the details of my purchase we chatted a bit. Josh explained the missing context of why he and KC0QVT were even engaging with the Facebookwits. When last week began, Bridgecom Systems had enough parts on hand to build ten last BCR-220 repeaters. When word got out that those ten BCR-220s were *the last of that product line*, all ten (mine was the tenth) sold within one week. That's more than Bridgecom Systems had sold in *months*. That demonstrated demand for BCM-220s gave Bridgecom's management some food for thought.

But there is that issue that 222-225 MHz radios are now hard to manufacture. It's not a common radio frequency, thus some custom parts are required. It's not high volume enough to entice Chinese radio vendors (see note at the end of this article). If US Amateur Radio is going to have a healthy, well-used 222-225 MHz band, it will require a stable supply of 222-225 MHz radios and repeaters, and to date, Bridgecom is the only supplier of such radios (new and purpose built for Amateur Radio) and especially, repeaters. But, of course, Bridgecom is a small business in a niche market, and tying up \$50k for eight months, and then a trickle of sales to pay back that investment slowly probably isn't sustainable. So, something has to change. I have two

suggestions.

The first is to do what KC0QVT suggests - crowdfunding. The BCM-220 radio is a low margin product to begin with (\$240 when I bought my first one in 2016, and the BCM-144 and BCM-440 are still that price today), so the additional overhead of Kickstarter probably isn't viable for this particular project. But... something *like* crowdfunding where the customers can take on at least part of the cost burden seems like a reasonable ask on Bridgecom's part.

My second suggestion is to think a bit outside the box for applications for BCM-220 radios that would increase demand for them, for faster sales than casual use by individual Amateur Radio Operators. VARA FM is the hot new data mode in Amateur Radio VHF / UHF. It works very well for [sending Winlink traffic at speeds of up to 25 kbps](#) when a radio can support it, and the Bridgecom BCM radios can so (though they use a unique high density 15-pin DSUB connector [same connector as a VGA monitor]). It's feasible that Bridgecom could demonstrate, and then promote BCM-220s for use with VARA FM, including operation of VARA FM through a BCR-220 repeater. That's an experiment that's on my list for N8GNJ Labs, but perhaps Bridgecom with its resources could do it faster than I'll be able to.

It's an unfortunate phenomenon in Amateur Radio that most of our VHF / UHF repeaters have mostly fallen silent through lack of use. What conversation there is has mostly moved over to Digital Mobile Radio (DMR) "talk groups" that often, only involve RF using small, low power "hotspots" in homes. Even with all this unused airtime on all those repeaters, Amateurs and repeater owners / trustees are reluctant to allow use of data modes such as VARA FM on their repeaters on a regular basis.

But, operating data modes such as VARA FM through a repeater makes data operation more useful and efficient, just as voice operations through a repeater is more useful and efficient than voice simplex. It seems to me that putting 222-225 MHz repeaters on the air designated for data use has multiple "wins":

- There is more active use of the (lesser-used) 222-225 MHz band;
- Bridgecom sells more BCM-220 radios and BCR-220 repeaters;
- Data operation over repeaters gets easier and more visible from Bridgecom's development of plug and play VARA FM;
- VARA FM / Winlink gets even more useful because they can depend on having access to repeaters for more reliable and wider coverage data communications;
- VARA FM / Winlink can be used simultaneously with 144-148 MHz and 440-450 MHz voice operations without interference.

As for my BCR-220 repeater? I bought it with the idea that it can become a repeater for use by the Bellingham Makerspace Amateur Radio Group, and experimenters in general in Bellingham and Whatcom County for data communications use. There aren't (as) many 222-225 MHz repeaters in this area, so it should be easier to find it a location for it at a high point (maybe not a mountain; perhaps a tall building) without interference to existing VHF and UHF systems, including commercial systems.

As I explained above, any existing repeater is encumbered with the unfortunate burden that it's defacto perceived to be a "voice" repeater and thus requires continuous explanation and justification to the naysayers about the "noises" that data modes "cause" to the "listeners". (Such behavior reminds me of the [fabled "5 Monkeys Experiment"](#).) Thus, even though it's wasteful and inefficient to put "yet another repeater" on the air, in comparison to the burden of trying to do data modes over existing, albeit unused repeaters is, in the end, *just... saner!* With *this* 222-225 MHz repeater, us data users and experimenters won't have to "Mother May I?" about anything we choose to experiment with over such a repeater.

I'll certainly let you know how it goes with this new repeater.

Update: An excellent location for this repeater has been identified!

Footnote on 222-225 MHz radios from China - As I discussed in Zero Retries 0018 and Zero Retries 0019, there *is*, potentially the TYT TH-9000D (on Amazon, search for that model and 220-260 MHz) that potentially can be modified for reasonable data speeds. For general (voice) use, there are also multiband radios from China that claim to include the 222-225 MHz band. To me, the jury is still out on those radios' usefulness on 222-225 MHz. For example, on the [AnyTone AT-D578UVIIIIPRO](#) "tri-band" DMR radio, the transmit power of the 222-225 section of that radio is either 5 or 10 watts (I've seen both mentioned), not the full 50 watts of the VHF and UHF sections. It can be done - I have 222-225 MHz radios that have power output of 50+ watts. AnyTone chose not to do so in this radio - they just wanted to claim "tri-band" at the minor cost of "throwing in" a crappy 222-225 MHz radio section.

Thus, I'd be much more comfortable with a Bridgecom BCM-220 radio for use on 222-225 MHz, especially for data - *if* they do become available again. And yes, I'd step up to park some patient funds with Bridgecom to reserve my new BCM-220 radios.

N8GNJ Labs Update

In **Request to Send** above, I mentioned a purchase from TAPR.



Photo courtesy of TAPR

This is the \$30 TAPR Raspberry Pi WSPR Beacon HAT (Hardware Attached on Top) that “cleans up” WSPR transmissions generated at one of General Purpose Input / Output (GPIO) pins on a Raspberry Pi using software to modulate the GPIO pin fast enough for radio transmission. While it’s possible to just attach an antenna to the GPIO pin, it’s not “Good Amateur Practice” to do so as the resulting radio signal includes square waves, harmonics, etc. TAPR’s [WSPR Beacon boards](#) provide minor amplification, filtering, and a real antenna connector. I purchased the version for the [30 meter \(10.130 - 10.150 MHz\) band](#).

My primary reason for this purchase is as a demonstration for the Introduction to Amateur Radio classes that I’ll be leading in 2022 for the [Bellingham Makerspace](#). I think it’s going to be an impressive demonstration to hold up a Raspberry Pi board and ask the class “Anyone know what this is?”. Almost certainly I’ll get someone who identifies it. Then I’ll connect this board, insert the Micro SD card with the WSPR software, and then ask the trick question “Now what is it?” I doubt I’ll get the answer (the intended audience is the public who haven’t had any previous exposure to Amateur Radio) that “it’s *now* a radio transmitter”.

But to prove the point that it really works, I’ll have to get it on the air and rack up some contacts that I’ll be able to display on [WSPRnet](#). Thus, it will be a short-term project to get it on the air. I’m imagining that I’ll string a simple dipole in the yard, and put the Raspberry Pi transmitter in a waterproof enclosure, and probably just power it with a battery, and watch what happens with the magic of WSPR.

ZR > BEACON

- **Hacking Ham Radio for Texting - An Arduino shield taps the potential of VHF handheld radios**

The Twittersverse and several techie websites mentioned [this project](#) published in IEEE Spectrum. The author discusses his prototype system consisting of an Amateur Radio VHF / UHF portable radio, a display, and a keyboard. They’re agog that you can exchange text messages without benefit of the Internet or mobile networks.

- **NinoTNC Ready Made Boards**

Scott Newton W4CSN reports “I just posted another batch of 20 Built NinoTNC’s for sale on my [ETSY Shop](#).” See my reply to KA2DEW in Feedback Loop below as to why this is important.

Feedback Loop

- **Tadd Torborg KA2DEW on Zero Retries 0019:**

Thanks for the insightful article!

Regarding the diversity of packet radio.. there are quite a few different reasons that it is diverse. First look at why it was NOT diverse in the 90s. In the 90s, hams (and everybody else) knew they wanted always-up network access, and for a while packet radio provided that better than the Internet did, for DxClusters, ham-radio-mail and news, and hobby station-to-station digital communications. Packet hardware sold like crazy. Implementations based on TAPR designs sole great and there wasn’t a huge drive to make completely new non-TAPR-standard products.

56K/9600/repeaters, were not strictly necessary to do the things the majority of hams were looking for. Once the Internet became accessible to most of us, packet radio went into the junk drawer. At that point, packet radio was history. APRS was possibly the only survivor and APRS has pretty much become an accessory of the Internet, its ham-radio-alone functionality mostly ignored.

So now you have a rather rare hobby. Most non-APRS packet radio equipment at a large hamfest is old and sold cheap. APRS is still surviving on Internet life support. WinLink is partly blooming because the user interface for it is so easy to master. But its application is also mostly tied to the

Internet.

There is new interest in ham-radio packet, I think, because so many VHF/UHF operations are becoming dependent on the Internet. It's really hard to get intra-state communications without Internet. Packet radio can deliver that, without the Internet.

...

KA2DEW's comments continue - browse to Zero Retries 0019 and scroll to the bottom of the issue for the comments section.

KA2DEW - Agreed wholeheartedly that what TARPEN is doing is viable and interesting, especially to existing, experienced, Amateur Radio Operators. However, my impression is that TARPEN's "buy the board, source the parts, solder it together, scare up a radio that works (especially for 9600 bps), cable it all together, get it on the air" is all a bit much for new or prospective Amateur Radio Operators. What I've observed is that those folks want to learn about alternative wireless communications that don't depend on Internet or cellular, and if it looks fun or useful, then they'll dive deeper. They're used to buying things, plugging them together, and experimenting at the software, or networking levels rather than "solder it together yourself and hope I did it right" approach. We can debate about whether that aversion to soldering is regression, or evolution, in Amateur Radio, but in either case, it just *is*. If we want Amateur Radio to feel approachable to these new folks, we have to have something available for them to feel comfortable in trying to join in the fun. W4CSN [might be able to help](#) with that issue.

- **Bill Seward W4EXT** on Zero Retries 0019:

I think this "tribalism" is occurring because the Internet makes widely distributed speech so cheap and easy. Before the Internet, it took considerable resources, in terms of money, time or both to communicate with a mass audience. With the Internet in its current form, anyone can set up a website, blog, email list or whatever for little to no money (at least at first) and in an evening or less. So everyone with a bright idea (and I'll stipulate that a lot of them are quite bright) to create some new facet of ham radio can jump in and get it going. Because we're conditioned to search for "packet radio north Carolina", we find Tadd and his good works. Groups like the old TAPR are on page 3 of the search results and we never see them. So we get a Tait, a ninoTNC and hook into TARPEN.

Well, not me, not yet. I'm still a bit far to the west. But it's coming my way, slowly but surely. :-)

W4EXT - Thanks for that interesting insight about web searches! I just did a search for "packet radio in whatcom county washington" and far down on the first search page were the two primary Amateur Radio groups in Whatcom County... but our Digital Group activities were not on that first page. That's definitely something to work on!

Contributors This Issue

My ongoing thanks to pseudostaffers [Dan Romanchik KB6NU](#), [Jeff Davis KE9V](#), and [Steve Lampereur KB9MWR](#) for continuing to spot, and write about "Zero Retries Interesting" type items about Amateur Radio and beyond, on their respective blogs. All three spot some amazing stuff that I miss, and offer great insights.

Join the Fun on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, here are some pointers:

- **Ham Radio for Dummies** by Ward Silver N0AX is now in its [4th edition](#). N0AX is a gifted writer, and HRFD is a great overview of Amateur Radio.
- My favorite YouTube channel for a good overview of Amateur Radio, the one I recommend is **AmateurLogic.TV**. [These folks](#) just seem to have so much fun!
- Dan Romanchik KB6NU offers [free PDF versions](#) of his *great No-Nonsense Study Guides*.
- [HamExam.org Amateur Radio Practice Exams](#) offers good **Flash Card and Practice Exams**.
- When you're ready to take an **Amateur Radio examination** (Tech, General, or Extra), W1MX - The MIT Amateur Radio Society offers [remote exams](#), free for students and youngsters. *There are apparently many other remote exam options.*

And, *bonus* - with an Amateur Radio license, you'll be [more attractive on dates](#) 😊

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way other than (in the absence of much feedback) getting some satisfaction that the data shows that people actually do read Zero Retries.

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More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ
Bellingham, Washington, USA
2021-11-26

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Below is a much more complete "footer" that has evolved over 30+ issues of ZR.

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- [Radio Amateur Training Planning and Activities Committee \(RATPAC\)](#) offers weekly presentations on general Amateur Radio topics (Wednesdays) and emergency communications in Amateur Radio (Thursdays).
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Closing the Channel

- In its mission to grow Amateur Radio and make it more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex!
- My ongoing Thanks to Tina Stroh KD7WSF for, well, *everything* and Bill Vodall W7NWP as *Zero Retries Instigator in Chief*.
- My ongoing Thanks to pseudostaffers [Dan Romanchik KB6NU](#) and [Jeff Davis KE9V](#) for continuing to spot, and write about "Zero Retries Interesting" type items, on their respective blogs, from Amateur Radio and beyond, that I don't spot on my own.
- [Southgate Amateur Radio News](#) consistently surfaces "Zero Retries Interesting" stories.
- The [Substack email publishing platform](#) makes Zero Retries possible. I recommend it for publishing newsletters.

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Thanks for reading!

Steve Stroh N8GNJ (He / Him)

These bits were handcrafted in beautiful Bellingham, Washington, USA

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